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USSR Report

TRANSPORTATION

No. 100

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CONTENTS

AIR

INNOVATION, PRODUCTION EFFICIENCY IN AVIATION REPAIR SECTOR DISCUSSED

Outstanding Plant Reviews Year

Moscow VOZDUSHNYY TRANSPORT in Russian 31 Dec 81 p 1

[Article by V. Snegin, Aktyubinsk: "The Plant Expands"]

[Text] The first year of the 11th Five-Year Plan is coming to a close. Many collectives were highly successful in this year and reached new goals. The aviation repair workers of Plant No 406 of Civil Aviation have reason to be proud.

The collective of the plant has received numerous red banners and been featured on the Board of Honor for high labor indicators. But to increase the production of output and not mark time it is necessary to expand production areas. Plant No 406 has followed this course. During the last five-year plan they launched a dock-hangar, a garage, a boiler room, a shop building, and other facilities.

The plant workers will remember the outgoing year for their labor accomplishments. But they were not able to solve all problems completely. Thus, many workers still do not have good housing (as a rule those who have worked less than four years at the plant). They plan to solve this problem in the coming year by beginning construction of a residential building. Then during the five-year plan another residential building and a dormitory will be built.

There is no doubt that this is a realistic plan. The plant workers have built the best Pioneer camp in the city, organized a good subsidiary farming operation that produces 800 tons of barley, and are completing construction of a preventive health clinic. In short, at plant No 406 they do not fear problems, they solve them.

The collective of the plant was pleased to learn that our ministry fulfilled its plan ahead of schedule. Fulfillment of the annual plan by each enterprise will make it possible to fulfill the plan for the sector as a whole, the workers believe, and by their shock labor they demonstrate that their actions are as good as their words.

Civil Aviation Innovations in 1981 Reviewed

Moscow VOZDUZHNYY TRANSPORT in Russian 1 Apr 82 p 2

[Article by V. Shulgin: "The Best Collectives of Innovators are Named"]

[Text] The results of socialist competition for invention and efficiency work in civil aviation in 1981 have been summarized. Carrying out the resolutions of the 26th congress of our party, innovators of the sector successfully fulfilled their assignments for the first year of the 11th Five-Year Plan. In 1981 the number of efficiency proposals used in production increased by 1,234 over the number for the preceding year and the number of inventions applied increased by 72. For the year as a whole 42,157 efficiency proposals were introduced and produced an economic impact of more than 32.8 million rubles.

Among the many proposals that had substantial economic impacts were the following: "Re-equipping the An-30 aircraft for Freight"; "Unit for Repeated Corrosion-Proofing of GTD-350 Aviation Engines for the Mi-2 Helicopter"; "Modification of Technology for Repairing the Electrical Equipment of Il-62M Aircraft"; "Protection of the Metal Elements of the Working Chambers of Wind Tunnels"; and "Modification of the Design and Technology for the Water Supply Installation for Machine Washing of Transport Aircraft."

The introduction of innovations aimed at intensification of production, raising its efficiency, reducing heavy and labor-intensive jobs, and automation and mechanization of production processes made it possible last year to conserve more than 150 tons of metal, 6.8 million kilowatt-hours of electricity, and 20,000 tons of fuel and to lighten the heavy physical labor of 4,000 persons.

The best indicators in invention and efficiency work in 1981 were achieved by the Ukrainian and Moscow transportation administration, the Uzbek, Magadan, and Leningrad administrations, TsUMVS [expansion unknown], plants No 409, 410 and 411, the Riga Institute of Civil Aviation Engineers, VNII PANKH [expansion unknown], the Kirsanov Aviation Technical School, and construction-installation administrations Nos 15 and 3 of Civil Aviation.

Invention work was improved at UGATs [expansion unknown], the Belorussian Administration, plants Nos 400 and 243 of Civil Aviation, and NETs AUVD [expansion unknown].

The innovators of the Uralsk and Tyumen administrations, the Estonian SSR Production Association, Plants Nos 402 and 421, and construction-installation administrations Nos 8, 20, and 21 of Civil Aviation did not do quite as well.

Unfortunately, invention and efficiency work at the East Siberian and Arkhangelsk administrations, plants Nos 24 and 67, and construction-installation administrations Nos 10 and 19 of Civil Aviation remains at a low level.

By order of Chief Mar Avn B. P. Bugayev, minister of civil aviation, first place for results of socialist competition in invention and efficiency work for 1981 and award of the Challenge Red Banner of the Ministry of Civil Aviation,

the Central Council of the All-Union Society of Inventors and Efficiency Workers, and the Central Committee of the Trade Union of Aviation Workers was given to the Ukrainian Civil Aviation Administration, Plant No 410, the Riga Civil Aviation Engineer Institute, and VNII PANKh. First place with the challenge red pennant of the Ministry of Civil Aviation, the Central Council of the All-Union Society of Inventors and Efficiency Workers and the Central Committee of the trade union of aviation workers was awarded to the Kirsanov Aviation Technical School and construction-installation administration No 15 of Civil Aviation.

The second place finishers were the Latvian SSR Production Association, the Moscow Transportation Administration and the Uzbek Administration, plants Nos 409 and 411 of Civil Aviation, the Kiev Civil Aviation Engineer Institute, NETs AUVD, the Kremenchug Flight School, and construction-installation administration No 3.

Thus the results have been totaled. They are gratifying and at the same time they must make certain collectives think things over. We are confident that the innovators of civil aviation will make every effort to continue increasing the pace of scientific-technical progress, fulfill the assignments of the 11th Five-Year Plan, and celebrate the 60th anniversary of Aeroflot in a worthy fashion.

Repair Plant Uses New Labor System

Moscow VOZDUSHNYY TRANSPORT in Russian 4 May 82 p 1

[Article by P. Ivanov, Mineral'nyye Vody: "They Are Fulfilling Their Obligations"]

[Text] The brigade for final processing of Yak-40 electrical and radio equipment at aviation repair plant No 411 of Civil Aviation is always a leader. What is the reason for the success of this harmonious collective of aviation repair workers?

"Above all it is that we are working under a system that is new for us, using a coefficient of labor participation," answers brigade leader Aleksandr Babkin. "This progressive technique helps us achieve good indicators."

He is right. At the plant they give serious attention to new forms of labor, to mechanization, and to the work of efficiency experts. This is not all; a vigorous attitude also helps young workers achieve success. The brigade leader himself is an example. He takes part in the work of the Komsomol-operations detachment, the Komsomol committee of the plant, and the Fantaziya discussion club. As much as he has time for!

"We work on the principle, the more you do the better you do," explains Yuriy Rydanov, Komsomol group organizer of the brigade. "This applies on the job and in public life."

For this small collective May is a special month. The Komsomol members have obligated themselves to fulfill the obligations they assumed in honor of the 19th Komsomol Congress ahead of time and celebrate the glorious holidays of

May Day and Victory Day with shock labor. The fact that the shop turns over more than 90 percent of its output on first submission is to the credit of the Komsomol-youth brigade headed by A. Babkin.

Invention, Efficiency Work Promoted

Moscow VOZDUZHNNY TRANSPORT in Russian 8 May 82 p 1

[Article: "The Best Will Emerge from the Competition"]

[Text] The Central Council of the All-Union Society of Inventors and Efficiency Workers and the USSR State Committee for Inventions and Discoveries are conducting an all-Union public inspection this year for maximum use of inventions and efficiency proposals. There will be a competition among ministries and departments, as well as the author collectives of enterprises and organizations. Diplomas and monetary prizes have been instituted as incentive for the winners.

The detachment of invention and efficiency workers of our sector did well last year: 42,157 proposals were introduced and the economic impact was more than 32.8 million rubles. Among the collectives which achieved the best results were the Ukrainian, Moscow Transportation, Uzbek, TsUMVS, Magadan, and Leningrad adminstrations, plants Nos 409, 410, and 411, the Riga Institute of Civil Aviation Engineers, VNII PANKh, and the Kirsanov Aviation-Technical School.

The innovators of the sector have enough experience, initiative, and enthusiasm. This makes us confident that the invention and efficiency workers of civil aviation will take a worthy place in the all-Union public inspection.

Successful Kiev Plant Director Interviewed

Moscow VOZDUSHNYY TRANSPORT in Russian 22 May 82 p 2

[Interview with A. Kudrin, director of the Kiev Aviation Repair Plant No 410: occasion, date, and place not specified]

> [Text] The labor victory of the aviation repair workers of the Kiev Plant No 410 in socialist competition last year was a solid contribution by the collective to the achievements of the 11th Five-Year Plan. The high evaluation of the work of this leading enterprise in the sector shows that the people there take a highly responsible attitude toward fulfillment of state assignments for repair of aviation equipment, approach their work creatively, and look for and find additional reserves to raise production efficiency.
>
> Our correspondent V. Tishchenko met with plant director A. Kudrin and asked him to talk about the things that help a collective achieve high indicators in their labor and about the future prospects of the enterprise.

[Answer] Soviet civil aviation crews are not the only judges of the quality of our labor. The plant repairs An aircraft and hundreds of aircraft assemblies

which are operated by airline companies in Europe, Africa, South America, and Asia, often under very harsh climatic conditions. And the thing that makes us happiest, of course, is trouble free work by aviation equipment that has been restored in the shops of the plant. Not a single unit repaired at the plant was a cause or potential cause of an accident in 1981. That is the most important thing.

[Question] Can you say what factor has been decisive in achieving excellent production results?

[Answer] In fact there are several. They are expressed in the general thrust of our labor this year, which was precisely outlined in the article "Key Reserves for Improving the Work" by minister of civil aviation B. P. Bugayev, published in the newspaper VOZDUSHNYY TRANSPORT on 2 February 1982. In the article, calling on all aviation workers in the sector to celebrate the 60th anniversary of the formation of the USSR and the 60th anniversary of civil aviation in a worthy fashion he said that every collective must focus its attention and efforts on realizing the crucial party objective of sharply increasing the role of intensive factors in the development of public production, insuring that growth in final results is greater than growth in expenditures.

Our workers and specialists in the shops, sections, and brigades discussed this article with interest. This provided new impetus in the search for new ways to improve repair processes and technology. For example, take the zone method of work which we applied instead of the system method. Its introduction made it possible to sharply raise labor productivity and improve the quality of output. At the same time it increased the accountability of each person. Other examples could also be given which enabled us to take steps, although perhaps not so significant, toward improved work. I want to observe that our management and the party and trade union organizations are orienting people to carrying out a set of measures. After all, only good organizations at the plant level can produce positive results.

[Question] In short, the quantitative and qualitative level of repair of aviation equipment that has been achieved is the result of introducing many reserves. Therefore, let me put the next question this way: do you still have more reserves?

[Answer] Certainly. To find them we must raise the effectiveness and public awareness of socialist competition to a higher level, stimulate the interest of inventors and efficiency workers, and manage production creatively. The search for reserves is becoming critical right now because the collective has been given another important assignment which is becoming paramount. We must incorporate repair of the engines installed in Yak-42 aircraft. Accomplishing this will be the most accurate statement of our capabilities. After all, even by itself this challenge contains a mass of unknowns: where can we find specialists capable of developing the new technology, reconstructing production areas, and fabricating the equipment? And we do not simply need specialists; we need energetic people who have not just tactical perspectives, but are also able to take into account the problems of later years. We have turned to our only source, searching for internal production reserves. And after weighing everything, we have selected several brigades which have gotten to work on the many questions of the

preparatory period. You may wonder how this reorganization has affected primary production? Work in the sections has, of course, become a little more intense. But the people are working with enthusiasm. Everyone understands that large-scale transportation in the new airship depends on how we handle the prerepair stage.

[Question] Your plant has the reputation of an enterprise that incorporates the repair of new types of equipment quickly. What is this based on?

[Answer] I cannot agree with the word "quickly." This kind of job is always the most difficult test of any collective, a test of the strength of the entire foundation of production. I think we must look for the explanation in the ability of our enterprise to reorganize itself as rapidly as possible. In this we are helped by our "capital," the experience accumulated by the collective in repairing different aircraft, engines, and assemblies. But our main guarantee lies in the specialists of the enterprise, the veterans and young people who are capable of handling assignments of any difficulty.

[Question] Just over 18 months remains until repair work on Yak-42 engines will begin. How would you evaluate the course of preparations?

[Answer] We are training specialists according to plan. Reconstruction of the engine shop is going well. But not everything depends on us. At the present time we are still waiting for the arrival of stands and repair-installation tools. I wish the Ministry of Aviation Industry, taking into account our preliminary agreement, would catch up on deliveries. But it is not up to us.

11,176
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BIRD-AIRCRAFT COLLISIONS

Moscow VOZDUSHNYY TRANSPORT in Russian 25 Sep 82 p 4

[Article by Vladimir Yakobi, candidate of biological sciences: "Birds Against Airplanes"]

[Text] When an airplane is traveling at high speed a bird of average size hits it like a shot. In 1981 a Tu-134 jet airliner that had taken off from Mineral'nyye Vody airport collided in the darkness with a flock of migrating geese. The aircraft made a forced landing.

There have been numerous similar cases in world aviation experience. In the USSR, for example, up to 1,500 collisions between birds and civil aviation aircraft occur each year.

In view of this our country is devoting a great deal of attention to ornothological studies whose purpose is to determine what kind of birds collide with airplanes, when and where, and to work out means and measures to avoid such situations.

The first aviation-ornothological research was begun in our country in 1966 at the Institute of Evolutionary Morphology and Ecology of Animals imeni A. Severtsov of the USSR Academy of Sciences. Scientists surveyed more than 50 airports in the Baltic region, the Ukraine, the Caucasus, and Central Asia and analyzed information on aircraft collisions with birds. They learned that almost three-fourths of these cases occur at airports and in their environs at low altitude where airplane and bird traffic is most intensive. The victims of the collisions are generally young birds migrating across air routes who are seeing an airplane at a close distance for the first time and cannot turn aside in time. The probability of collision increases under poor visibility conditions (at night, in clouds, and in twilight).

But what steps are being taken to avoid collisions? In Tallinn, for example, a permanent bioacoustic device to frighten away birds was used successfully for a number of years. Ten powerful loud speakers standing along the runway played taped recordings of gull alarm calls. This proved an effective means against birds appearing at the airport for the first time, which are the most dangerous to airplanes. A mobile bioacoustic device mounted on a motor vehicle also demonstrated good results.

In addition, conditions are created that lessen the attractiveness of the airport to birds as a place for feeding and nesting. This is helped, specifically, by eliminating food waste from restaurants and dining halls. Thick, high grass on the flight field makes it more difficult for insect-eating birds to find food and for gulls to rest. Gulls prefer to do this in open areas, even on the concrete of the runway. At the same time, cuckoos and ducks may nest in such grass. Removing knot weed, whose fruit attract pigeons (this was observed in the Ukraine), can greatly reduce the number of them flying into such places.

About one-fourth of the bird collisions with airplanes take place away from airports, but they are the most dangerous ones. The only means now available to avoid such collisions is to detect large migrations of birds across flight routes, both day and night, at high altitudes and far from the airport by means of airport radar. If a large number of birds appear in the path of airplanes a storm-type warning is given. Sometimes the flight is canceled or the pilot is instructed how to fly around the danger region. For example, the zone of the massive spring migration of sea ducks on the west coast of Estonia was 90 kilometers long and 15-20 kilometers wide. This entire area was occupied by a continuous stream of migrating flocks flying at altitudes up to 2.5 kilometers. Combining radar and visual observations of bird migrations makes it possible to predict them taking into account weather and landscape conditions.

The first such observations in the USSR were made in Turkmenistan, where it was established that large flocks of pelicans fly significant distances across the desert at altitudes of 2.5-3 kilometers and they are practically invisible from the ground. In Estonia during the migration molting sea birds were observed that traveled in large, loosely organized flocks at night at altitudes up to 4.5 kilometers and about 100 kilometers from the sea. In Lithuania radar observations tracked new bird migratory routes and showed that only one-tenth of the full migration is identified visually. They establish a relationship between mass movements of birds and certain meteorological factors. The distinctive characteristics of the night flight of cranes were established in Moldavia. These data make it possible to forecast the ornothological situation to insure flight safety for aircraft. In certain regions of the country information on mass flights of birds observed visually or by radar transmitted on an operational basis to airports lying in their path and used to warn pilots and airport personnel.

Scientists are now giving attention to the use of light to frighten birds away from a flying aircraft. Turning on the landing lights during takeoff and landing, both day and night, seemed to reduce the number of collisions. But it was later learned that on dark nights the light from the landing lights blinded the birds. This increased the likelihood of collision, including birds getting into the lights. Therefore, it is now recommended that lights be turned on at night at the lowest possible altitude.

Laser is being tested to frighten away birds. When a laser beam strikes the eye of a bird, like a ray of sun, it causes an unpleasant effect which has a frightening action at a distance of 600-800 meters. It is possible that laser will find another application here. Work is underway to automate the detection and recognition of bird migration using radar.

11,176
CSO: 1829/007

UZBEKISTAN CIVIL AVIATION CAPABILITIES SLATED FOR EXPANSION

[Editorial Report] Tashkent SOVET OZBEKISTONI in Uzbek 28 July 1982 carries on page 2 an 800-word article by E. Sa"dullayev titled "Sky Gate." Sa"dullayev reports on the current and projected expansion of civil aviation facilities in Uzbekistan, basing part of the article on an interview conducted with Ghani Mazitovich Rafiqov, chief of UzSSR Civil Aviation Administration. Rafiqov remarked that during the 11th FYP a substantial portion of AN-24 and YaK-40 airplanes will be taken out of commission and replaced by 70-passenger Tu-134 liners. A group of Uzbek pilots has been sent for flight training in these craft. In the last quarter of 1982, the YaK-42 and IL-86, flown by pilots from Moscow, will begin to operate in the republic. Rafiqov stated that Tashkent pilots must learn to fly the IL-86 and Samarkand pilots the YaK-42, which will be used mainly on local flights. Further, the air time of TU-154 and TU-134 airplanes and of KA-26, MI-2 and MI-8 helicopters is increasing. Asked whether airports are to be renovated and reoutfitted along with the expansion of airfields, Rafiqov replied that during the 11th FYP airports would be required to handle a volume of 3.4 billion passenger kilometers. The plan calls for building modern airport complexes in Karshi, Navoi, Bukhara, and Fergana, renovating airfields in Samarkand and Termez, and finishing the renovation of the Nukus and Tashkent airports. The correspondent Sa"dullayev continues that the civil aviation administration has decided to curtail further reconstruction of unprofitable airports at Saryasiya, Tamdy and Muynak, introduce flight costs as the basic indicator for evaluating aviation services, and to reconstruct the Namangan, Termez, Navoi, Turtkul, Kokand, and Kungrat, so that they can accommodate YaK-42s and TU-134s. Other developments noted by Sa"dullayev include the following. The average air time of every plane will be increased beginning 1983. Agricultural crops will be cultivated on 6.5 million hectares of airfields. The KA-26 helicopter will be moved from Urgench to Kokand for consolidation. The MI-2 helicopter fleet in Khorezm will be enlarged and, if necessary, the MI-8s from other fields will be transferred here. In connection with the expansion of steppe reclamation projects, planes and helicopters will be moved from Sergeli to the Dzhizak aviation enterprise, and the Sergeli base will be turned into a rest facility and training center for pilots. Tashkent airport will get new terminals for IL-62 and IL-86 flights to center and international airports, while the present terminals will be used for local flights. Sa"dullayev concludes that the expansion at Tashkent will make it possible to open direct flights linking the city with capitals of socialist countries and of south and southeast Asian states.

CSO: 1836/6

UDC 625.7:624.138.232

USE OF REINFORCED GROUND RECOMMENDED FOR ROADBEDS IN SOVIET NORTH

Moscow AVTOMOBIL'NYYE DOROGI in Russian No 3, March 82 pp 9-10

[Article by candidate of technical sciences Yu. M. Vasil'yev: "Road Surfaces of Reinforced Ground in the Northern and Northwestern Regions of the USSR"]

[Text] The significant growth in the intensity of traffic and cargo capacity of motor vehicles, the increase in safety and comfort requirements for travel, and the growing volume of construction of vehicle roads force us to look for ways to increase the strength and durability of road designs while reducing their cost and material-intensiveness. One of the main ways to solve this problem is wide use of local grounds, ungraded rock material, and industrial by-products.

The construction of experimental-production segments of road foundations made of gravel-sand mixtures and sand reinforced by cement was begun in Leningrad Oblast in 1956. Examination of the segments showed that their condition is evaluated for the most part (78 percent of the segments) by category I, while the remaining segments were evaluated in categories II and III[1] (category I indicates adequate strength of the road surface, with no deformations; categories II and III correspond to the presence of individual sagging places and small cracks and segments with significant destruction of the road surface). The evenness of the surface on such segments is higher than on other road segments. The modulus of elasticity of the reinforced material after extended use (more than 10-15 years) was 1,000-7,400 megapascal.

Long-term studies of the used segments with bases made of cement-reinforced ground in the northwestern regions of the USSR enabled us to conclude that these grounds, reinforced by cement, are road building materials with high technical-economic and operating qualities. At the same time we identified the causes of deformation of these bases, which include inadequate compaction of the roadbed, inadequate strength of the road surface under conditions where traffic significantly exceeds calculated intensity, temperature-shrinkage crack formation (especially with an excess of cement), and imperfection of the technological process of reinforcing grounds.

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[1]M. B. Korsunskiy, "Otsenka Prochnosti Dorog s Nezhestkimi Dorozhnymi Odezhdami" [Evaluation of the Strength of Roads with Non-Rigid Road Surfaces], Moscow, "Transport", 1966.

Later, concurrently with theoretical studies in 1968-1972, a number of segments were built in which the particular layers (base, frost-protective layers, and upper layer of the roadbed) as well as the entire road surface were made of reinforced materials. Not just cement, but also lime, carryaway ash, and composite binding agents (cement + polymers + viscous bitumens, and the like), including binding agents with different additives, were used to reinforce various kinds of materials. In the 1970's production installations were also built in Leningrad Oblast, the Komi ASSR, Estonia and Latvia. Thus, the Estonian road builders alone built more than 400 kilometers of roads with bases and surfaces made of grounds and materials reinforced with active carryaway ash. It should be noted that these bases in recent years have also been done on category I roads.

Construction experience and the results of observation of several experimental facilities have been described several times in the technical literature.[2]

Summarization of the results of observations of road surfaces in use with layers made of reinforced materials in regions with unfavorable natural and hydrogeological conditions demonstrated their significant superiority to road surfaces made of granular materials. This superiority lies in longer preservation of the evenness of the surface, especially with intensive frost heaving of the roadbed ground. Thus, where the difference between the elevations of surface uplift in a segment with a frost-protective layer of sand was 15 millimeters, in a similar segment whose frost-protective layer was cement-reinforced ground the difference was just three millimeters where the total uplift in both segments was 40-45 millimeters. Reducing the unevenness of uplift (buckling) of the surface promotes longer preservation of a level surface.

A level surface has a significant impact on the prime cost of shipping: the number of accidents on roads with only satisfactory evenness of the surface is 1.5-2 times greater than on roads with good evenness, while the prime cost of shipping is 1.3-1.5 times higher.

Another advantage of reinforced materials is a significant improvement in the water-heat regime of the roadbed. Monolithic (dense) reinforced materials usually have a lower residual porosity (less than 3-7 percent) and thus cannot act as accumulators of surface water which usually collects in the pores of granular base materials and the frost-protection and drain layers of the road surface during the springtime. This water is the principal source of overmoisturization of the top layer of the ground of the roadbed during the initial phase of its thawing. As a result, long-term observations have demonstrated, the calculated moisture content of the ground in segments with a road surface made of reinforced ground is (0.05-0.3) W_T less than in segments with a road surface made of granular material (W_T is the ground fluidity moisture content).

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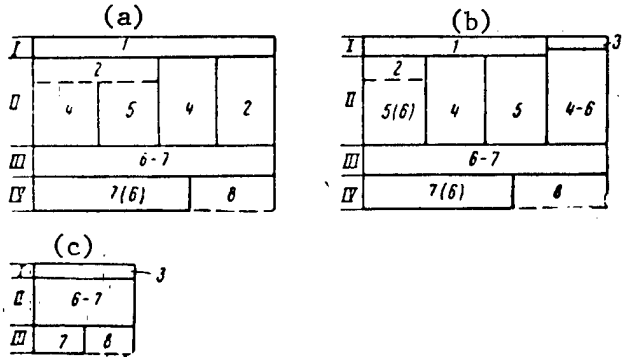
[2]Yu. M. Vasil'yev, "The Work of Cement-Ground Bases in the Northwestern Regions," AVTOMOBIL'NYYE DOROGI, 1972, No 7; Yu. M. Vasil'yev and M. G. Mel'nikova, "Installation of Frost-Protection Layers Made of Reinforced Grounds," AVTOMOBIL'NYYE DOROGI, 1975, No 3; Yu. M. Vasil'yev, "Reinforcement of the Upper Part of the Roadbed," AVTOMOBIL'NYYE DOROGI, 1975, No 9.

Because of the greater strength qualities of reinforcement materials compared to granular materials the total thickness of the road surface can be reduced 20-50 percent, which makes it possible to cut the required amount of expensive graded mineral materials (sand and crushed rock) by 15-45 percent, with corresponding reductions in the need for motor vehicle transportation (one-third to two-thirds), labor expenditures (one-tenth to one-half), and the construction cost of the road surface (5,000-22,000 rubles/kilometer).

Furthermore, reinforcing the top layer of the roadbed, especially under conditions where it undergoes seasonal excess moisturization, makes it possible to stabilize the strength and deformation parameters of the ground within assigned quantities and insure, for example, a modulus of elasticity of the roadbed surface equal to 40, 60, or 80 megapascal. This gives a basis for building the same types of road surfaces on long segments, which is an important factor in accelerated construction. The thickness of the reinforcement layer of the top layer of the roadbed ranges from 10 to 40 centimeters and is determined by local conditions.

The presence of reinforced layers, especially the ground of the top part of the roadbed and the frost-protective layer, completely precludes mixing the material of the base and the material of the underlying layer, improves conditions for compacting the overlying layers, and insures a high degree of evenness on their surfaces. This, in turn, is a positive factor that insures a level surface. The reinforced layer can be used temporarily for vehicle traffic.

Approximate Diagrams of Road Surfaces Made of Reinforced Ground



Key:
(a) Road Categories I and II;
(b) Road Categories III and IV;
(c) Road Category V;
(I) Surface;
(II) Base:
(III) Frost-Protective Layer;
(IV) Road Bed;
(1) Dense Asphalt Concrete;
(2) Porous Asphalt Concrete;
(3) Surface Treatment;
(4) Reinforced Ground with Heightened Deformation Capability, Strength Class I;
(5) Reinforced Ground, Strength Class I;
(6) Reinforced Ground, Strength Class II;
(7) Reinforced Ground, Strength Class III:
(8) Ground with E > 40 Megapascal.

Measurements have shown that the total modulus of elasticity on segments with a base or other layers of reinforced materials in the springtime is 1.5-3 times greater than on similar segments with layers made of granular materials, and there are 1.3-3.2 times fewer sags. It is interesting to note that the pressure on the ground of the roadbed in such segments is scarcely one-third of the pressure on segments with layers made of granular materials. Decreasing the force effect on the ground reduces the probability that local plastic deformations will occur in it, and is thus a factor that has a positive impact on prolonged preservation of a level surface.

Thus, the long-term test with operation of road segments in the northern and northwestern regions of the USSR whose surface has layers of reinforced materials demonstrated the high technical-economic and operating efficiency of these designs. The figure above shows the recommended schematic diagrams of the road surfaces.

The road surface is designed together with the roadbed taking into account transportation-operation requirements and the category and significance of the road. The need to install frost-protective layers is determined by calculating the frost-resistance of the design. The top part of the roadbed should be reinforced when the calculated modulus of elasticity of the ground is less than 40 megapascal or in those cases when the technical-economic advisability of insuring a modulus of elasticity of 60 or 80 megapascal for the roadbed surface over a substantial length has been established. Intermediate layers of granular materials can be put into insure outflow of water.

The designs of roadbeds whose layers are made of reinforced materials meet contemporary requirements almost completely and should be widely used in northern and northwestern regions of the USSR.

11,176
CSO: 1829/339

MOTOR VEHICLE

HARVEST DELIVERIES DELAYED BY VEHICLE SHORTAGES

Yerevan KOMMUNIST in Russian 4 Sep 82 p 1

[Article by S. Arutyunyan: "Empty Runs"]

[Text] It is common knowledge that agricultural work cannot be precisely organized without rigorous observation of the schedule of freight shipping and efficient use of motor vehicle transportation. The facts show that the Echmiadzin procurement workers do not always handle freight shipping properly. At a number of kolkhozes vegetables are left lying in the fields because of a shortage of vehicles while means of transportation return from other farms empty. This picture can be observed almost every day at the kolkhoz of the town of Lemugi; vehicles often leave there empty or underloaded. The same thing happens at the sovkhozes imeni Lenin and Gekhanist.

For example, on 10 August two trucks returned from fields of the rayon empty and four others were underloaded. The situation was repeated again the next day, except that this time three trucks had to make their trips without loads and six were underloaded.

On 12 August the Echmiadzin procurement center (director is G. Mkrtchyan), to insure itself, ordered a smaller number of vehicles, just 48. Nonetheless, the same thing happened again. There were the same empty and underloaded trips as there had been the day before.

The procurement center and farms of the rayon, without precisely organized interrelationships, are unable to adjust the actual need for motor vehicle transportation. This why it is flagrantly wasted. The schedule of deliveries must be brought within the norm. After all, the procurement workers are facing an even more difficult test: hauling the grapes and melons.

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RAILROAD

PAVLOVSKIY DETAILS RAILROADS' ROLE IN FOOD PROGRAM

Moscow GUDOK in Russian 8 Jul 82 p 2

[Article by I.G. Pavlovskiy, USSR minister of railways: "Rail Transportation in the Agro-Industrial Complex"]

[Excerpt] The Scale and Volume of Transport

Presently, transportation of goods for agriculture and agricultural products is more than 15 percent of the entire volume of our railroads' work. This adds up to more than 525 billion ton-kilometers. Rough calculations indicate that, by 1990, as a result of implementing the Food-Supply Program, the proportion of this agricultural transport will sharply increase and will be more than 20 percent of the overall freight traffic. This means that every fifth ton-kilometer travelled on our railroads will be directly linked to transportation for the agro-industrial complex.

The impressive changes in agriculture and in all branches of the agro-industrial complex which have occurred since the March (1965) Plenum of the CPSU Central Committee have been mirrored, as it were, in the volume and type of transportation on our railroads.

Of course, the most massive agricultural goods are cereals: grain and the products received by milling it. In 1965, the freight traffic in cereals was 83.7 billion scheduled ton-kilometers, and in 1981 the total was 139.5 billion scheduled ton-kilometers. That is an increase of more than one and one-half times! The average daily shipment of grain during the Tenth 5-Year Plan, as compared with 1965, increased by 42 percent. At the same time, the increase was 22 percent on the Ukraine's railroads, and 114 percent in Kazakhstan. This is entirely understandable. There was intensive assimilation of virgin soil and long-fallow land in Kazakhstan. Wheat from Kazakhstan is now being delivered to the central areas of the USSR, the Central Asian republics and many industrial centers in other areas.

In the Twelfth 5-Year Plan, it has been planned to increase the average yearly production of grain to 250-255 million tons, as compared to 205 million tons in the Tenth 5-Year Plan. Transportation will also increase, although the volume of transport will not nearly be proportional to the harvest. Each year, the rail network expands and the capacity of granaries

increases. This allows a sharp reduction in seasonal, repeated transport of grain. With large and heavy-duty grain elevators, it becomes possible to fully mechanize freight-handling operations and increase the use of through-trains to transport agricultural products. It also becomes possible to better organize car preparation, thus making more efficient use of rolling stock and other transportation resources. Sharp peaks in grain transportation after the harvest complicate transportation operations. This is particularly true in August and early September, when the summer passenger traffic is at its height. The workers at our freight facilities, together with specialists from procurement and planning organs, must do some hard work to smooth out the uneveness in transporting agricultural products.

Each year, transportation of perishable food-stuffs increases. This is a most complex and responsible labor for us railroad workers. In the final year of the previous 5-year plan, the volume of transport of such products increased by 85 percent, as compared to 1965, and totalled 52.5 million tons. The increase was especially large for transportation of fruits, vegetables and gourd crops from the Trans-caucasian republics, Central Asia and the Moldavian SSR. Deliveries of early vegetables alone were almost 220,000 tons greater in 1980, than in 1975.

There has been a fundamental improvement in organizing the transportation of fruits and vegetables from Bulgaria. Special shuttle through-trains are loaded in the fraternal country, enter the USSR via the Varna-Il'ichevsk ferry crossing and proceed on to Moscow, Leningrad and other industrial centers. What are the benefits of this procedure? First of all, the need to transfer goods from one car to another is eliminated. Such transfers are labor-intensive and are not conducive to the safe-keeping of delicate cargo. Secondly, deliveries are speeded up by two to three days, which is very important for perishable items.

Speeding up delivery, reducing various types of cargo transfers to a minimum, developing mechanized freight-handling facilities, making extensive use of modern packaging, various types of containers and special rolling stock, establishing a single refrigeration transport chain from production points to consumption points--such, perhaps, are the basic railroad directions for improving the transportation of perishable goods. This involves a large complex of organizational, technical and production problems. The methods and means for solving many of these problems have been determined. They were set forth in a decision by the collegium of the Ministry of Railways and in the recently approved measures of our ministry which were developed in accord with the tasks assigned to the railways by the USSR Food-Supply Program. I will not repeat them, since GUDOK has already discussed them. But there is a series of problems, for which a concept of solution must still be developed. And our scientists and specialists are busy with these problems now.

In addition to delivering grain and perishables, the railroads are transporting large volumes of other cargo, necessary for the efficient functioning of the agro-industrial complex. Our country is the world leader in producing mineral and chemical fertilizers. During the past 15 years,

production and delivery of fertilizers to agriculture have increased more than three-fold. In 1965, the railroads transported 42.9 million tons of fertilizer; in 1981, the total was 120 million tons. Especially significant were the increases in transporting apatite concentrate, potassic and calcareous fertilizers, phosphoric ore and meal. These items make up about 30 percent of the overall volume for transportation of fertilizers.

During the current 5-year plan, the production of fertilizers will increase by 30 million tons. The volume of transportation of unpackaged fertilizers is increasing. In this regard, the railroads are supposed to receive about 4,500 mineral-carrying cars each year. Of course, it is important to make more productive use of this rolling stock, maintain it properly and prevent damage to it.

Our country is generously equipping agriculture with the most diverse type of machinery. Railroad workers can judge the scale of equipment deliveries, based on the volume of transport. On an average day now, 2,600 carloads of agricultural machinery is being transported. That is 1,000 carloads greater than in 1965. Deliveries of fuel and lubricants to rural areas are also increasing. During the past 15 years, these deliveries have increased roughly two-fold and totalled 61.8 million tons in 1981.

The railroads have accumulated valuable experience in transferring combines and trucks from one area to another, when the equipment is needed for harvesting. During the Ninth 5-Year Plan, the volume of these transfers was 177,000 carloads per year. The rate for loading trucks and combines went as high as 50 through-trains in a day. As a result of increased deliveries of motor vehicles to rural areas and the re-deployment of equipment within oblasts, the scale of these transfers is decreasing. But, there are still a lot of such transfers. In 1981, approximately 100,000 carloads of equipment were transferred.

Transportation of livestock fodder is also increasing. For example, compared with 1965, transportation of balanced fodder has increased by 14.8 million tons--an increase of more than 2.5 times. In arid years, it is necessary to transport a large amount of coarse fodder. Thus, from October 1981 through May 1982, we had to transport 267,000 carloads of hay and straw over long distances (more than 1,500 kilometers). Of course, this is a great deal of additional work for the railroads. Rolling stock is poorly used, the average freight car load is lowered, etc. But the railroad workers understand that this transportation is necessary for preserving livestock and they make every effort to conduct the operation smoothly and in an organized manner.

However, we can't reconcile ourselves to obviously inefficient transportation, including transport of goods of the agro-industrial complex. An analysis shows that the volume of transport from the opposite direction, repeated and excessively long transport of agricultural products is approximately 34 billion ton-kilometers. In 1981, the volume of repeat transport grain exceeded 17 million tons. Approximately 300,000 cars were diverted for this work.

We deliver about 20 million tons of agricultural products over distances of less than 50 kilometers. In particular, there are a lot of short delivery trips for beets (6.5 million tons delivered over distances of less than 50 kilometers). Frequently, these deliveries are made in the opposite direction. There is a large volume of opposite direction and so-called cross-over transport for potatoes, vegetables and fruits.

A large and unwanted additional burden rests with rail transport because the chemical industry continues producing fertilizers which are not sufficiently concentrated. For example, during the course of this year, 5.5 million tons of ammonia solution have been delivered over an average distance of 590 kilometers. There is only 20 percent ammonia in the solution. Thus, we are hauling about 4.5 million tons of ordinary water over such a great distance. Or consider another fact. In 1981, due to the failure to fulfill the task for increasing the content of useful material in fertilizers, we had to transport 6 million tons of inert admixtures, thereby performing an additional 6.5 million ton-kilometers' worth of work.

The railroads are taking measures to eliminate inefficient transport. In 1981 alone, transportation of 21.5 million tons of goods in inefficient directions was excluded from plans. But in this matter of national importance, we must be more demanding of shippers and be more insistent about raising issues with planning, supply and sales organs. Improved transport planning is important leverage for increasing the efficiency of the railroads' entire operation and reducing the state's proportion of transportation expenses. And this leverage must be used to the fullest extent.

Quickly, Efficiently, Without Losses

There is a very broad range of cooperation and interdependence between rail transport and the agro-industrial complex. The overwhelming majority of our enterprises and organizations are sponsors for kolkhozes and sovkhozes. Many repair plants produce items for the rural sector. Agricultural areas receive about eight percent of their total consumable electrical power from our tractive sub-stations and distribution networks. Whereas the delivery of electrical power to rural consumers was 1.2 billion killowatt-hours in 1965, the total is now 8.5 billion killowatt-hours--a seven-fold increase. Hundreds of thousands of railroad workers live in rural areas and are closely linked to agricultural production and the rural way of life.

At present, there are more than 400 sovkhozes and subsidiary farms and 240 pig-fattening centers operating in the rail transport system. In addition to centralized funds, the railroad workers receive about 10,000 tons of meat, 14,000 tons of milk, 10 million eggs, 25,000 tons of potatoes and vegetables from these farms during the course of a year. An assigned task is to increase meat production to 10-11 kilograms per rail worker by the end of the Eleventh 5-Year Plan. The fact that this goal is realistic has been convincingly demonstrated by the experience of the Krasnoyarsk Railroad's subsidiary farms, where this goal has already been met. The Northern Railroad is close to this goal. Our enterprises and organizations must be bolder and more energetic about setting up and developing subsidiary farms. In areas where this is

expedient, we must unite the efforts of workers from all enterprises of a junction or even of a railroad division. We should do our utmost to support the partnership of horticulturists and make better use of land in areas designated for the building of railroads.

All of this is important, all of this must be taken into consideration and acted upon. But of course, the main thing for us railroad workers is to organize, in an exemplary manner, transportation service for rural areas and the entire agro-industrial complex.

In Section Four of the USSR Food-Supply Program, devoted to transporation, it is written that "measures must be implemented in the rail transport system to improve service of the branches of the agro-industrial complex, and improve the structure of the pool of freight cars used for transporting agricultural goods and food-stuffs."

In our country, there are tens of thousands of kolkhozes and sovkhozes and a multitude of small enterprises serving the agricultural sector and processing its products. Of course, in this area, transportation must be organized completely differently than it is in industry. We think that the policy of setting up a network of support stations, served by mechanized track sections and self-supporting industrial divisions, is fully justifying itself.

We now have about 200 such track sections and divisions. The volume of cargo handled by them has increased by almost 70 percent, compared with 1965. The degree of comprehensive mechanization increased by approximately one-third. At present, practically all goods arriving at kolkhozes and sovkhozes in open rolling stock are unloaded, then loaded onto trucks by men and equipment from our mechanized track sections.

It is very important that railroads and divisions, together with local party, soviet and agricultural organs, develop plans for concentrating cargo operations at support stations. They also must develop plans for transportation service of adjacent areas and define precisely the work which must be done at support stations in a given period of time. We must be sure to coordinate the location of support stations with the location of the motor vehicle roads which were built in accord with the Food-Supply Program.

Valuable experience in precise cooperation and business-like collaboration of railroad workers with rural laborers, employees of the "Sel'khoztekhnika" [expansion unknown] and "Sel'khozkhimiya" [expansion unknown] associations, and procurement organizations has been acquired on the North Caucasus, Belorussian, Tselina and several other railroads. This experience must receive the widest dissemination. It is important that matters be organized in such a way that kolkhozes and sovkhozes are freed from transportation problems, to the maximum extent. In this regard, the example of Shebekino Rayon in Belgorod Oblast is very instructive. A self-supporting association "Mezhkolkhozsel'prom" [expansion unknown], was set up in Shebekino Rayon. Operating in close contact with the railroad workers, this association unloads and loads freight cars in the shortest possible time, delivers all necessary

goods directly to the kolkhozes and ships the kolkhozes' products in a timely manner.

Valuable undertakings by a number of advanced collectives, in competition to provide exemplary transportation service to rural areas, have been approved by the collegium of the Ministry of Railways and the Central Committee of our trade union. GUDOK has discussed these undertakings in great detail.

Relying on advanced experience, we must develop and introduce everywhere a production process for transportation service to rural areas. Of course, there can't be a single stereotyped solution for our entire rail network, for all regions. After all, conditions vary widely and this must certainly be taken into consideration. We can say that it is one thing to organize massive shipments of grain but quite a different matter to regularly transport livestock products.

In connection with the Food-Supply Program, questions of specialized rolling stock demand special attention. Specialization promotes the safe-keeping of products during transportation. It also promotes mechanization of labor-intensive freight-handling operations, a sharp decrease in expenditures for packing and cleaning, and a reduction of various types of idleness, thus causing accelerated transport. Approximately 30 million rubles are spent in a year just for cleaning and washing box cars to carry grain and food products.

Use of hopper cars and establishment of fully mechanized warehouses enabled us to make a sharp reduction in losses of loose cargo, increase labor productivity in freight-handling operations by a factor of 3-4, and reduce expenditures for transportation by a factor of 1.5-2. Generally speaking, many perishable products can only be tranpsorted in specialized insulated cars.

The Food-Supply Program envisaged establishing the capacity for increased production of self-tipping cars and specialized tank-cars by the heavy machine building and transportation machine-building industries. These cars are used to transport mineral fertilizers and calciferous materials. Production of the cars is to be increased to 6,000-7,000 cars (tank-cars) per year.

In implementing specialization of rolling stock, we must not shut our eyes to the fact that this specialization will lead to an increase in empty runs and that transferring the empty cars will place an additional burden on the main lines which are already working intensely. Also, specialized cars will be more expensive.

It will take a considerable amount of time to augment the freight car pool with specialized cars. There are two important conclusions which can be drawn from this.

For a long time now, we have had to haul a considerable amount of grain, food-stuffs and fertilizers in box-cars. Therefore, we need an appropriate base for repairing and maintaining box-cars. An extensive network of service points was set up to prepare box-cars for loading. But these service points are still insufficient and we are experiencing serious difficulties. During the current 5-year plan, we are to put into operation 4 new depots and service points, capable of preparing an additional 4,400 cars per day. It is also planned to upgrade 50 service points by lengthening their gantries, by building boiler rooms, pump houses, cleaning facilities etc. This should increase car preparation by an additional 3,000 cars per day. A great deal of work to strengthen the repair bases is also planned for the Twelfth 5-Year Plan. The progress in developing and revovating these facilities must be under the constant monitoring of the directors of the Ministry of Railways' main administrations, railroads and divisions.

The second conclusion to be drawn is that paramount attention must be devoted to the efficient and productive use of specialized rolling stock.

Efficient use of insulated cars is especially significant. During the last 15 years, fundamental changes have occurred in the structure of the insulated car fleet. A considerable number of the old ice-cooled cars have been removed from the inventory and have been replaced by refrigerated sections and independent cars. At present, all transport of milk and dairy products, citrus fruits, frozen and refrigerated fish is taking place only on these modern types of rolling stock. During the last 5 years alone, average daily loading into refrigerator cars increased by 31 percent.

Yet, deliveries of the new refrigerator cars were obviously insufficient. They barely compensated for the removal of ice-cooled cars for the inventory. And since the volume of transport of perishable goods increased by factor of 1.8 from 1965 to 1982, the proportion of perishables delivered in insulated rolling stock actually decreased.

The structure of the refrigerator car pool is in need of serious improvement. Trains and car sections, that is, combined rolling stock, make up four-fifths of the pool now, and only 20 percent consists of individual cars. This imbalance hinders shunting work during both loading and unloading. Also, the reliability of the refirgerator cars still leaves a lot to be desired.

The food-supply program envisaged delivery of 29,000 to 30,000 refrigerator and insulated cars to the Ministry of Railways by 1990.

Our scientists and specialists, together with the car-builders and employees of planning organs, must precisely define the structure of the cars being delivered. It is perfectly clear that the proportion of independent cars should be increased. But the amount of the increase must be considered in an all-around manner. It is important to accelerate research with the aim of determining the areas on our railroads most expedient use of thermal cars and insulated containers. The experience acquired by foreign railroads in operating rolling stock must be closely analyzed.

The ministry is undertaking a number of effective measures for better use and improved maintenance of insulated rolling stock. It is planned to expand the rotation area for independent cars, increase the use of through-trains and make wider use of open "lines" in passenger train schedules to let trains through with perishable goods. It is also planned to increase the list of passenger trains to which cars may be hitched with very valuable fruit and vegetable products, etc. We must be more persistent in striving for expanded loading docks at enterprises subordinate to the Ministry of the Meat and Dairy Industry and the Ministry of Trade. At present, due to the limited size of the loading docks, refrigerator cars are frequently doomed to lengthy idle periods at unloading points. This not only causes losses in freight turnaround, it also rasies the threat of spoilage.

In the future, the greatest amount of attention will be paid to developing and improving the repair base, both at plant and depot levels, for refrigerator rolling stock. There is a great deal which must be done to improve the routine maintenance and operation of these cars, and insure strict observance of the prescribed temperature requirements. All of this must also help to insure the safekeeping of perishables.

This entire large group of problems, connected with transporting food-stuffs in insulated rolling stock, must be the center of attention for managers and specialists in the railroads, divisions and main administrations of the Ministry of Railways. Use of containerized and packaged transport is an important method for increasing the effectiveness of transportation support of the agro-industrial complex. During the past 15 years, the pool of containers increased by a factor of almost 1.8. The design of the container has changed qualitatively and their capacity has increased significantly. Today, containers are solely all-metal and are equipped with special devices for mechanized loading into a car and unloading. Containers with a gross weight of five tons now make up more than one-fourth of the pool. With each passing year, there are more large-capacity 20-ton containers. A lot of work has been done to set up container-handling points and terminals, and equip them with highly-productive machinery.

During the 1980's, that is, during the implementation period for the Food-Supply Program, the volume of containerized and packaged transport will increase three-fold. We must design and build 100 new container-handling points and renovate 350 existing points. The list of food products to be shipped in containers and packages must be expanded considerably.

The Most Urgent, Pressing Task

In his report at the May (1982) Plenum of the CPSU Central Committee, Comrade L. I. Brezhnev emphasized that the Food-Supply Program must show its first results this year already. Even today, this makes increased demands on the entire cycle of operations in the entire agro-industrial complex. The most urgent and pressing task for us, the railroad workers, is to organize transportation of the 1982 harvest precisely and without the slightest losses. This task should now be the main concern of all transportation leaders and every railroad worker.

In 1982, transportation of more than 190 million tons of agricultural products is planned. That is 8.6 million tons more than was delivered in 1981. It is planned to increase transportation of grain by one million tons. Transport of sugar beets will be increased by nine million tons. The increase for potatoes, vegetables and fruits will be four million tons. Of course, the harvest will modify these planned increases. We must also maintain close contact with agricultural and procurement organs, quickly make changes to the plans and skillfully manage our loading resources.

Since the start of this year, the railroad workers have done a great deal to assure the timely delivery of seed grain, agricultural machinery, motor vehicles, fuels and lubricants to rural areas. During the first 6 months the railroads, on the whole, fulfilled the plan for dispatching the basic types of agricultural products and food-stuffs. The volume of this transportation was more than 84 million tons.

Unfortunately, we did not avoid interruptions and shortcomings in transportation. On a number of railroads, late delivery of cars, to be loaded with mineral fertilizers, was tolerated. At times, cars with early vegetables were sent on circuitous routes; as a result, the delivery time was increased.

There is still a lot of damage to refrigerator cars and box-cars. Repair maintenance and preparation of these cars for loading is not properly organized everywhere. At times, food shipments are accumulating at certain sea ports and several border stations, due to lateness in hauling the shipments away. Serious complications in expediting freight car traffic have arisen in a number of regions in the railroad network.

Transportation of early vegetables and fruits from the southern areas is already being conducted on a wide scale now, but the main period of work lies ahead. There is not much time remaining before the start of this work. It is important that we complete all preparations for work everywhere as soon as possible, and in particular, that we normalize the operational enivronment on the rail network by efficiently allocating the freight car pool to local areas and speeding up track repairs on the routes which will handle the mass transport of the 1982 harvest.

In those areas where the loading of grain, vegetables and fruits will be concentrated, we must set up, in advance, a reserve of grain-carrying cars, box-cars, insulated cars and grain screens. We must also make provisions for the appropriate regulatory tasks to assure that empty cars will arrive regularly and without interruption during the peak loading period.

We must see to it that total preparation points for freight cars, weighing and refrigeration facilities, watering points for small livestock, spur lines to grain-acceptance points and other organizations involved with mass transportation of agricultural products are in complete readiness by the period of harvest work.

Of particular significance are well thought-out increases in freight car traffic, more extensive use of through-trains by freight dispatchers, and setting up precise and smooth loading and unloading both for a day and for a week. All of this must be considered by our leaders and specialists.

There is a very wide range of problems which must be solved while preparing for harvest work and the period of mass transportation of the harvested products. In this regard, the railroad workers do not lack for experience, as the saying goes. But in 1982, we are beginning to implement the Food-Supply Program, developed by our party. This program imposes particular responsibility on the railroads and requires the maximum degree of concentration, enterprise and efficiency.

The deputy ministers, members of the collegium of the Ministry of Railways, and directors of the main administrations and directorates are being sent to the railroads to make a driect examination of the situation at the local level, regarding preparations for the mass transportation of grain and other agricultural products of the new harvest. The officials will also see if urgent measures are being implemented to accomplish the mass transport.

The decisions of the May (1982) Plenum of the CPSU Central Commitee, plus the conclusions and instructions provided in Comrade L. I. Brezhnev's report, have beomce a guide to action for millions of Soviet people. I would like to express my confidence that, in response to the party's paternal concern for the welfare of the people, the railroad workers will exert maximum efforts and energy, all their knowledge, experience and creative initiative to successfully fulfill the Food-Supply Program and strengthen the economic power of our great motherland.

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NEW TECHNIQUE FOR ESTIMATING RAILROAD CONSTRUCTION COSTS EVALUATED

Moscow TRANSPORTNOYE STROITEL'STVO in Russian No 9, Sep 82 pp 40-42

[Article by doctor of technical sciences V. Ya. Shul'ga, and candidate of technical sciences A. G. Belov (Moscow Institute of Railroad Transportation Engineers) under the rubric "Research, Design, and Testing": "Refinement of Techniques for Determining the Cost of New Railroad Lines"]

[Text] The decree of the CPSU Central Committee and USSR Council of Ministers entitled "Steps Toward Further Improvement in Planning-Estimate Work" devoted considerable attention to the questions of correctly determining the cost of construction. In particular, it suggested considering mistakes made in determination of this key technical-economic indicator as violations of state discipline.

The methods used to determine the cost of building railroads, structures, and other facilities depend above all on the nature of the tasks being performed and the stage of planning. Thus, in the preplanning stage when substantiating the wisdom of building a line and planning the volume of capital investment based on the chosen alternatives, construction cost is determined on the basis of consolidated indicators, but when the plan is being developed the cost is refined on the basis of estimate calculations.

The decree contains an important statement: it is unacceptable for the estimated cost of construction to exceed the ceiling on capital investment established in the stage of substantiating the wisdom of construction. In order to comply with this requirement the construction cost of railroads should be determined when planning capital investment taking into account the lag in planning and construction.

The estimated cost established in the preplanning stage often rises during planning and construction of projects. This lowers the reliability and substantiation of plans, introduces disorganizing elements into construction work, and diminishes the role of the plan as the central management element.

For a long time one of the causes of this negative phenomenon was the lack of scientifically sound techniques that would make it possible to predict the amount of construction expenditures for transportation projects over calculated periods of time.

Analyzing the existing methods of determining the construction cost of lines in the preplanning stage, the authors of article [1] give a generally correct picture of the advantages of using consolidated construction cost indicators (CCCI's) and the A. D. Larionov methodology for this purpose. While sharing, to a significant degree, their point of view with respect to determining the amount of construction costs, it must be observed that CCCI's have a number of drawbacks.

Above all, CCCI's involve large labor expenditures. Furthermore, these indicators are static and reflect the technical level of railroad construction and price formation only for a certain period of time. Finally, it is practically impossible to automate the process of determining them.

Price-formation factors change over time, so significant discrepancies between the actual construction cost and the cost determined by CCCI's occur when establishing the amount of construction expenditures for an extended period. This is because of the static character of CCCI's. The same thing happens when CCCI's are used as the time when they were developed becomes more remote.

Therefore, the studies of B. A. Volkov and A. D. Larinov [2] on the development of statistical methods of forecasting cost expenditures in railroad construction based on using the actual construction cost of structures and other facilities obtained by analyzing the plans of existing lines are certainly interesting. This approach for the most part avoids the drawbacks inherent in CCCI's.

Regressive correlation analysis has already been applied to determine construction costs in civil and industrial construction. But B. A. Volkov is the first to use this technique for railroad construction. The novelty of using regression correlation analysis to determine the construction cost of railroads naturally aroused great attention in the results obtained.

Specifically, A. Ye. Gibshman and I. I. Zelikovich [1] expressed a number of critical remarks on the use of regression correlation analysis to determine consolidated indicators of the cost of new railroads. But many of their criticisms are debatable and caused largely by the authors' formalistic approach to analyzing the regression relationships obtained by B. A. Volkov. This can result in doubts about whether it is correct to use this approach to determine the consolidated indicators of construction costs.

Let us consider the theoretical premises on which the development of regression models is based.

Use of the regression correlation analysis technique, which is based on the least squares method, presupposes the existence of a set of initial data (sample) of both the indicator being modeled and the factors that determine change in the magnitude of the modeled indicator. The concrete values of the indicator and factors must be random quantities, that is not one but several different values of the modeled indicator correspond to a certain value of a factor. Therefore, the first thing that must be established in order to decide on the possibility of using the regression correlation analysis technique is whether there is a logical relationship among changes in the values of the modeled indicator when the values

of the factors change. The second question is whether the sample values of the indicator and factors are random quantities.

When determining the cost of building new railroads, there is no question that this cost depends on the values adopted during review of the physical indicators.

The estimated cost of construction of new lines, as well as for particular structures and other facilities, obtained during development of plans and adopted in calculations as the modeled indicators may be viewed as a random realization of the cost established for the corresponding line of the preplanning stage. This is because it cannot be established with a given probability, what concrete value the construction cost will take as the result of development of the plan and how much it will differ from the corresponding amount of construction expenditures adopted in the preplanning stage. This can be known only after development of the plan. The estimated cost of new lines is influenced by many factors that characterize local planning conditions: soil groups, hauling distances, the availability of quarries and their capacities, the qualifications of the planners, the possibility of mistakes in calculations, and the adoption of nonoptimal decisions. To a significant degree this makes it possible to consider the estimated cost of a concrete line a random quantity. Furthermore, the construction expenditures of a concrete line do not depend on the cost of the lines included in the sample. Thus, the construction costs of new lines included in the set of initial data may be viewed as random, mutually independent quantities. Use of the regression correlation analysis method in conformity with the requirements of the least squares method presupposes the need for observing the main characteristics of disturbances (deviations of the sample values of the modeled indicator from the theoretical regression line).

Work [2] demonstrates that these requirements are generally met.

The second important methodological principle that determines the practical value of the results of calculations obtained by the models is establishing the qualitative and quantitative uniformity of the set of cost and physical indicators of different plans under consideration and the possibility of considering the factors included in the model as random quantities.

It is customary to evaluate the qualitative uniformity of a set of initial data primarily from the standpoint of the objective of the investigation and the logical connection between it and the factors under consideration. Thus, if we are investigating the relationship between the cost of building a line and natural-climatic conditions, it is recommended that the sample include lines planned for different regions of the country. To consider change in the cost of building a line in time the sample should include lines built in different years. Similar procedures must be followed to shape the sample by other criteria. When it is necessary to investigate the combined influence of factors on the modeled indicator it is recommended that the sample be formed with due regard for the aggregate requirements of all the factors taken into account. From this point of view the sample of 71 railroads used by B. A. Volkov to obtain his regression relationships is representative and uniform.

It is customary to characterize the quantitative uniformity of the set of initial data by a coefficient of variation.

V. A. Balan's studies showed that reducing the variation of particular indicators and eliminating indicators with large variations from the calculations does not improve the adequate characteristics of the model [3].

It should be emphasized that, strictly speaking, most economic indicators are not random quantities. Representing them as random quantities in regression analysis is nothing more than a methodological technique and is correct within the limits of the model under consideration.

Thus, the theoretical premises for application of the regression correlation analysis technique to forecast the construction cost of new lines and its use in the preplanning stage are well-founded and noncontradictory.

Correct interpretation of the results of calculations obtained and knowledge of the limitations of the research method being used, in this case regression correlation analysis, are very important.

Of course, the resulting statistical relationship preserves its characteristics only within the limits of variation of the initial data and use of the relationship outside these limits is permissible only if the same conditions and qualitative relationships that characterize the set of initial data exist. Violation of this requirement can lead to incorrect conclusions as occurred, specifically, with the authors of article [1].

Analyzing the logical nature of the effect and strength of the influence of factors on the magnitude of the modeled indicator, it must be considered that the reliability of regression coefficients differs depending on the objective of the investigation.

In many relationships the low reliability of regression coefficients is not very important in calculations of the modeled indicator only. This is the task that usually faces planners when determining the construction cost of new lines in the preplanning stage where the principal objective is to establish the total amount of construction expenditures.

But if it is necessary to establish the degree of influence of each factor on the modeled indicator, the low reliability of regression coefficients leads to a distorted evaluation of the influence of the factor. This is very important, for example, when regression relationships are used to calculate the norms of specific capital investment for construction of lines and differentiation of them depending on different factors (construction conditions). But it should be emphasized that the regression coefficients in regression relationships do not designate the cost of a unit of a certain type of work or of structures and other facilities, expressed by factor indicators.

An important advantage of regression relationships, which are becoming especially significant in the current phase, is the possibility of taking change in price-formation factors into account and forecasting the construction cost of new lines for calculated periods. In the regression equations proposed in work [2], the growth in construction costs is mediated by use of a "line length" factor. This led the authors of article [1] to observe that this does not

correspond to the established practice of price formation. But the question needs more thorough analysis.

The established practice of price formation presupposes the use of constant prices for an extended time interval. For example, the estimate prices in effect today were introduced in 1969. These prices reflect the level of price-formation factors for the period preceding their development. These factors change over time, and to bring cost expenditures calculated by corresponding prices into line with actual expenditures it is necessary to use a large number of different types of correction factors during development of plan-estimate documents.

The logic of considering this "line length" factor is as follows. A longer line naturally also has a longer period of planning and construction during which changes are possible in the level of wages and the cost of the materials of parts and design elements, fuel, and other price-formation factors. Thus, let us return to the example cited in article [1] where construction times were compared for two lines 77 and 770 kilometers long; the corresponding construction times were two and 10 years. The quantity 110/648·100 = 17%, calculated beginning from an increase of 110,000 rubles in the cost of the line, by no means characterizes error. In this example the increase in the cost of the line with the passage of time averages 110/(10-2) = 13,750 rubles per year or 17/(10-2) = 2.1 percent a year. It must also be considered that local conditions and the organization of construction for very long lines usually differ from analogous factors on short lines. Among them are the use of organizational charts with two or more elements instead of just one, the location and capacity of quarries, and soil groups and hauling distances for them. But it would be more correct to link this in construction cost directly to the time factor, not to line length.

Use of regression correlation analysis makes it possible to automate the process of calculating the cost indicators of railroad lines. This is very important for setting up automated systems in planning. The possibility of operational consideration of the current level of price-formation factors which determine the construction cost of railroad lines is an advantage of the recommended approach.

The results of practical calculations are the criterion of the validity of the theoretical reasoning. When regression relationships are used correctly the results obtained are fully satisfactory.

A test calculation made by the Moscow State Planning and Surveying Institute of the State Industrial Committee for Transportation Construction using the B. A. Volkov methodology and based on initial data for a concrete line demonstrated the fairly high accuracy of the calculations. Thus, the difference between fundamental expenditures (the total of the first nine headings of the consolidated estimate) calculated by the Volkov method and by the plan was 8.6 percent, while the difference in the cost of production facilities was 5.6 percent (without considering specific projects). The department of construction economics at the Leningrad Institute of Railroad Transportation Engineers used the same methodology to make calculations for new lines planned in different regions of the country with a total length of about 2,000 kilometers.

Name of Heading or Section of Estimate	Standard Indicators	Indicator for the Plan Being Analyzed				
			Deviation from Standards			
	Standard Cost for Headings or Section, thousands of rubles/km	Cost of Heading or Section for Plan Being Analyzed, thousands of rubles, km	Absolute, thousands of rubles, km	Percentage	Estimate of Reliability Interval of Standard	Evaluation of Deviation
1. Total for Section A	1,608.18	1,664.60	56.42	3.39	12.52	4
2. Section B: Housing-Cultural Domestic and Municipal Construction	404.11	410.40	6.29	1.53	19.07	4
3. Total for Section A and B	2,102.95	2,075.00	-27.95	-1.35	15.48	4
4. Total of Nine Headings	875.57	929.70	54.13	5.82	12.69	3

The maximum amount of deviation of the cost indicators obtained for one of the lines (see table above) from the standards by sections of the plan, which means the amount of the corresponding expenditures obtained by regression equations, is no more than six percent. This illustrates the high precision of the calculations. The total cost of one kilometer of planned line differs from the standard by just 27,950 rubles or 1.35 percent. It is important to observe here that the magnitude of construction cost by the standard is somewhat greater than that obtained in the plan. It took just a few worker-days of preparation of raw data and punching it on cards and approximately 15 minutes of computer working time to determine the amount of construction expenditures according to the standards.

It is also important to observe that the standard values of construction expenditures were obtained for a line that is not included in the set of initial data, which describes the good forecasting capabilities of the models. Thus, the results of the calculations also confirm the theoretical soundness and practical value of the approach under consideration for determining the magnitude of construction expenditures in the preplanning stage using regression correlation analysis.

Nonetheless this method still needs refinement. Above all the discrepancy caused by the fact that standard values of construction expenditures by sections

of the estimate are calculated with different regression equations must be excluded. As a result of this the total magnitude of construction cost for one kilometer of line (total for sections A and B) is not equal to the sum of expenditures for Section A and Section B separately.

In addition, the results obtained for certain lines are not as stable as the results in the example cited (especially for Section B). This illustrates the need for further refinement of the specifications of models and more careful preparation of initial data.

Thus, it is plainly too soon to conclude that the regression correlation analysis technique is not applicable for determining consolidated indicators of the construction cost of new lines in the form recommended by B. A. Volkov. Already today this approach can unquestionably be used to clarify the construction expenditures of new lines in the preplanning stage; it is also usable in this way for other common transportation construction projects, in particular second tracks and electrification facilities.

FOOTNOTES

1. TRANSPORTNOYE STROITEL'STVO, No 9, 1980, p 34.

2. V. A. Volkov and A. D. Larionov, "Analiz Smetnoy Stoimosti Stroitel'stva Zheleznykh Dorog" [Analysis of the Estimated Cost of Building Railroads], Moscow, "Transport", 1980, 159 pages.

3. V. A. Balan, "Ekonomiko-Matematicheskiye Modeli Proizvoditel'nosti Truda" [Mathematical Economic Models of Labor Productivity], Moscow, "Nauka", 1979, pp 90-91.

11,176
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CONTAINER SERVICE DESCRIBED

Yerevan KOMMUNIST in Russian 17 Jul 81 p 3

[Article by Novosti Press Agency correspondent Ye. Smirnov: "Transit Across the USSR. International Cooperation"]

[Text] This year, the millionth container will travel on the Trans-Siberian Container Service (TSCS) route connecting the Southeast Asian countries with the nations of Europe.

In a discussion with this Novosti Press Agency correspondent, the general director of the all-union "Soyuztranzit" association, Anatoliy Nazarov, said that "the Trans-Siberian Container Service has only been in operation since 1971, and in its first year, only 2,325 containers were transported via this route". He remembered: "the idea of a Trans-Siberian container bridge had arisen a long time ago. Transport of cargo from Japan to Europe through Siberia began in the 1930s. Even then, the advantages of this 13,000 kilometer route were obvious, as compared with routes through the Suez and Panama Canals or around Africa. The length of the routes ranges from 20,000 to 27,000 kilometers. That is why the organizers of the TSCS had no doubts about the commercial success of this undertaking. But the actual demands for transit across Siberia exceeded even the forecast estimates. Of course, these demands were particularly fostered by the development of trade between Japan and its European partners."

"It is true that the increased transport along the TSCS route has been accompanied by definite difficulties, resulting from an imbalance in the flow of cargo traffic. The flow of goods from Japan to Europe is two to three times higher than the flow in the opposite direction. We had to organize transport of empty containers. But this did not reduce the interest of business circles in transit traffic across Siberia, because even taking into account these expenditures for transport of empty containers, the Trans-Siberian route is considerably more profitable than other routes".

"Of course, some difficulties might arise in the future, but we are deeply convinced that such difficulties will not halt the further growth of transport across Siberia. In conditions of constantly expanding trade between the countries of Europe and the Pacific Ocean basin, it would be simply absurd for the

cargo owners to give up the shortest overland route and thereby ignore both the time savings and the high degree of reliability of the transportation. That is why our "Soyuztranzit" association, which transports foreign cargo across the USSR, is even today working on the problems of improving the TSCS, taking into consideration long-term developments."

Also, in the future the Baykal-Amur Mainline, which parallels the Trans-Siberian Railroad, will enable a significant reduction in transport time across the USSR for foreign goods.

The general director of "Soyuztranzit" emphasized that, simultaneously with increased transport along the TSCS rail route, transport of containers through the USSR will increase on the air route.

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BRIEFS

BRIDGE UNDER CONSTRUCTION--The workers of the "Mostostroy-9" [Bridge Construction-9] Trust have begun construction of the railroad bridge which will unite the western and central sections of the Baykal-Amur Main Line. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 35, Aug 82 p 3] 9887

MINSK SUBWAY CONSTRUCTION--Minsk. The builders of the first phase of the Minsk subway have begun the final straight section of track. They have been laying the permanent tracks in the section between the "Park chelyuskintsev" and Moskovskaya" stations. Taking into consideration the shallow bedding of the tunnels, the designers envisaged the use of shock absorbers to reduce the level of vibration and reduce noise. The subway builders are confidently approaching the activation of the first phase, whose construction is planned to be completed 6 months ahead of schedule. Installation of the last stretch of open track in the center of the city is proceeding at a rapid pace. The builders will unite the tunnels, after construction of a subterranean corridor beneath the Svisloch' River, where ground waters will be frozen. Finishing work is in progress at many first-phase stations. [Text] [Moscow GUDOK in Russian 17 Aug 82 p 1] 9887

RAILROAD REMOTE CONTROL--Kungrad (GUDOK Correspondent's Report). Installation is being completed and acceptance tests are taking place at Kungrad for remote control of electric power supply devices. The work is being directed by chief power section engineer Sarybayev and senior electrical mechanic Zhitnin. Remote control will enable an increase in reliability for the traction power-supply system and traction power substations on one of the most difficult rail sections, running through the Ustyurt desert plateau to Beyneu. A graphic control panel has already been installed. Switching the Kungrad junction to remote control is one part of a long-range program to improve the electric power supply system for all divisions of the railroad. The Ashkhabad, Chardzhou and Dushanbe divisions have already been switched to remote control. During the current 5-year period, it is planned to switch the Karshi and Termez divisions, plus the rail junction at Kushka Station to remote control. [Text] [Moscow GUDOK in Russian 29 Aug 82 p 2] 9887

MOSCOW SUBWAY CONSTRUCTION--Recently, S. Chernyshev's tunnel-driving team from SMU-10 [Building and Installation Directorate 10] of "Mosmetrostroy" [Moscow

Trust for Subway Construction] installed the last ring of the left tunnel between the "Kantemirovskaya" and "Lenino" stations, while constructing the Zamoskvoretskiy radius, which will go into operation at the end of 1984. The tunneling was completed almost 4 months earlier than specified in the socialist obligations accepted by the workers. [By V. Krakhotina] [Excerpt] [Moscow MOSKOVSKAYA PRAVDA in Russian 20 Aug 82 p 1] 9887

CSO: 1829/320

REPORT ON NAVIGATION CONDITIONS IN CENTRAL ARCTIC REGION

Moscow VODNYY TRANSPORT in Russian 18 Sep 82 p 1

[Article by G. Simkin, Tiksi: "Conquering Icy Miles"]

[Text] The navigation season began 10-15 days late this year in the central Arctic, the Laptev and East Siberian seas. Even before it began the weathermen were providing an unconsoling forecast, and it was borne out. In most segments of the polar seas the solidarity of the old ice reached 9-10 points and it was difficult even for heavy-duty icebreakers to cross it. What was worse was that from time to time unfavorable winds would cause compressions in the ice bridges.

The first caravan of the Northeastern Maritime Fleet Administration, consisting of seven ships and destined for Shmidt Cape, Pevek, and Green Cape, was held up for eight days at Svyatoy Nos Cape. Finally ice reconnaissance found a lead in the solid field of ice. Information from an earth satellite confirmed the general picture of ice distribution in the segment from Dmitry Laptev Strait to Indigirka. A decision was made to send the caravan into the crack and move toward Kolyma. It was a risky decision, but it paid off. With the help of the icebreaker Kapitan Melekhov, the ships moved slowly but confidently toward their goal.

The tankers Zhigansk, Pamyat' 26 Komissarov, and Dzhorat are carrying petroleum products to Khatanga. Even under ordinary conditions they work at very high intensity. But here the ice situation made things more complicated. Specialists say that they have never before observed such solid ice conditions. Even escorted by the icebreaker Semen Chelyuskin the tankers were unable to get through to Khatanga. The maritime operations headquarters for the western sector of the Arctic was forced to allocate an additional icebreaker. The caravan moved with enormous difficulty, but in the end the seamen were able to deliver their valuable cargo.

While the fleet awaited an improvement in the situation and forced its way through the ice only the line from Green Cape to Pevek was operating precisely. The thing is that each year after completion of the shipping season in the central Arctic SVUMF [Northeastern Maritime Fleet Administration] sends several ships to help out the Sakhalin Steamship Company. Then in the summer, after taking on cargo in Nakhodka for delivery to Green Cape and Pevek, they return home.

This year the ships Ivan Strod, Afanasiy Bogatyrev, Platon Oyunskiy, and Maksim Ammosov worked in this way. The ships reached the East Siberian Sea in late July and delivered important cargo to the northerners. After unloading they took on coal in the port of Green Cape and transported it to Pevek. The permanent SVUMF line has begun to operate regularly.

This is perhaps the future of the administration, send part of the fleet to the Far Eastern lines and set up a permanent ship anchorage in the Green Cape region. Incidentally, there used to be an anchorage for the tug-lighter fleet at Kolyma. In 1979 such a temporary anchorage had to be set up. Experience has shown that despite unfavorable navigation conditions in Tiksi, the Kolyma-Pevek line begins operation earlier and 10,000 tons of coal are delivered to their destination.

The Yakut Oblast CPSU Committee suggested that SVUMF organize an anchorage for several ships in Kolyma to speed up the delivery of coal. There is a possibility of increasing such shipping. The question of development of the Chaunskaya thermal power plant in Pevek is now under consideration. The need for coal may increase five times. Therefore, an earlier opening of the navigation season will be needed. It would obviously be wise to resolve this problem quickly and undertake certain expenditures in order to see that the fleet spends less time at anchor and that the very short Arctic navigation season is extended.

"I agree that this is a major reserve for stable shipping," Yu. Lukin, deputy chief of SVUMF, agreed. "Unfortunately, a number of unsolved problems have accumulated. Together with the extremely difficult ice situation they are holding up development of navigation in the polar seas and rivers. One of them is the great deviation of the volumes of cargo actually delivered for transshipment from sea to river compared to the volumes established by USSR GOSSNAB and ratified by the Ministry of the Maritime Fleet. This disrupts the activity of the Tiksi base port and draws justified complaints from the Lena Steamship Company. The company is not receiving the planned goods from us and the river workers are unable to plan the work of their fleet and port.

"In our opinion, the main reason is that orders are not balanced with the capacities of the suppliers and railroads that deliver cargo to the eastern and western seaports. The most unpleasant thing is that SVUMF has been deprived of the possibility of influencing the course of shipping. We do not have any information about the accumulation of cargo in these ports. The Tiksi seamen adopt measures through the Ministry of the Maritime Fleet, communicate with the ports on their own, and get information about cargo. But they do not know anything about the cargo that is en route and at the warehouses of clients and what suppliers have prepared for shipping. In all likelihood the Yakut ASSR GOSSNAB should have such information. But its executives themselves call Tiksi and request the information. It is obviously time to reorganize the work of this important subdivision so that SVUMF receives the necessary information from it and can organize the work of the fleet and ports correctly."

Ice conditions for sailing in the polar seas have improved. The icebreaker Kapitan Khlebnikov escorted the diesel ship Pioner Chukotki around the

Novosibirskiye Islands. In the port of Tiksi it transferred its cargo to river ships and they delivered it to Yana. The ships Gayla Komelva, Nar'yan-Mar, Vasya Shishkovskiy, Kansk, Pioner Slavyanki, and Andomales have arrived. The docks of the port have come alive. Rafts on the Yana and Indigirka have also arrived in the bay; diesel ships carrying wood have departed, and all the regular lines have begun operations, some of them with icebreaker escorts. The schedules of fleet work had to be revised and times reduced in order to handle the plan for transshipment of cargo in all sectors.

On the important Tiksi-Yana line shipping is being done on the principle of linear navigation according to a schedule coordinated with the river workers. But some Green Cape to Yana through traffic is organized in sequential trips.

The port workers of Khatanga got the navigation season off to a good start. They are working steadily and meeting their assignments for processing sea-going ships. They were able to incorporate use of the TMI-3 floating pontoon with a cargo capacity of 2,500 tons. It has excellent seaworthiness and is irreplaceable in processing ships on an open roadstead. Whereas formerly ships of the Northern Steamship Company and then ships of SVUMF were used to unload ships at Kosistyy Cape, they have now been replaced by the pontoon and these ships have been switched to shipping work. Of course the port workers of Khatanga desperately need another such pontoon. Together with the two lighters that are being delivered it would solve the problem of fleet processing on the open roadstead.

In Khatanga they have established a second dock, acquired more lift trucks, and expanded warehouse areas.

Navigation is moving ahead intensively in the polar seas of the Central Arctic. The Tiksi seamen are the first to reach the bars of the Arctic rivers and the last to leave when intensive ice formation begins in the sea. They leave and after them radiograms arrive in Tiksi expressing gratitude for their heroic labor, courage, and persistence in delivering cargo to the most remote points in the basin. One of these radiograms arrived on the day of my departure. It said "The polar workers of the Dunay Lighthouse thank the entire crew of the diesel ship Alga for prompt unloading of our equipment and precise work in a difficult ice situation near the islands. The lighthouse was surrounded by a thick ring of ice on all sides. The seamen had to break through a narrow strip of ice. Their smooth unloading work causes a feeling of sincere gratitude."

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MORE ON IMPORT, EXPORT DELIVERY DELAYS

Moscow VODNYY TRANSPORT in Russian 23 Sep 82 p 2

[Article by A. Tsarev, deputy chief of the Azov Maritime Steamship Company: "Port or Storehouse?"]

> [Text] The transshipment of grain at Azov ports this year is three times as much as for the corresponding period of last year.
>
> The economic managers and public organizations of the steamship company have done a great deal of organizational-technical work to receive an unprecedented amount of cargo. Not everything has gone smoothly; there have been breakdowns. An additional five docks had to be specialized and all-weather bunkers and reloading devices to work moving cargo from one ship to another had to be prepared on an urgent basis. The efforts of the collectives have produced pretty good results. During the operation, however, the seamen have run into serious obstacles; if they were overcome the indicators could be even better. This was the subject of a discussion between our correspondent V. Zhivotkov and A. Tsarev, deputy chief of the Azov Maritime Steamship Company.

We have run into a paradoxical situation. Some cargo recipients are refusing to accept shipment of imported equipment from the ports.

Equipment delivered from Italy for the Atommash [Nuclear Machinery] Association has been lying in the port of Zhdanov since last November. It can only be sent to the construction workers by river. The port workers are ready to ship it and the Don River workers have agreed to carry it, but the cargo recipient has flatly refused to accept this equipment.

The Azov ports are also packed with large-diameter pipe for the gas pipeline. More than 5,000 tons of pipe has been stored for more than a month on the docks of the port of Zhdanov alone, and five ships carrying pipe are standing in the roadstead. The ports have been turned into points for storage of cargo, not processing. There is no room to maneuver in the port region. We are clearly deprived of reserves for further increasing our handling of imported foodstuffs.

What is the matter? The foreign trade associations are not coordinating plans for shipment of pipe in mixed rail-water transportation at the proper time. Port workers are also troubled by the endless bans on pipe shipment by the Ministry of Railroads.

The situation is no better with export cargo. In the port of Kerch, for example, 29,000 tons of steel in rolls, almost 4,000 tons of rolled metal, and a thousand tons of cast iron is awaiting processing. The owner of the cargo, the Promsyr'yeimport [Industrial Raw Material Import] Foreign Trade Association, has not given the orders for its shipment.

This is not a new topic. A strict procedure must be established so that shipment of goods to seaports cannot be authorized until contracts for their sale have been concluded.

We have been able to establish working relationships with the managers of the Volga-Don River Steamship Company, the Donetsk Transportation-Dispatching Enterprise, and the Kerch maritime fishing port. Our partners have gone to work energetically shipping and processing import cargo and have taken over a significant part of the burden of the railroad and port workers.

In order to speed up fleet processing the Azov Steamship Company has adopted a policy of sharply increasing cargo shipment in consolidated units. This kind of shipping grew 20 percent in the first half of the year. Delivery of cargo on trailers increased noticeably as the steamship company received new specialized ships. This promoted a significant improvement in the work of the line from Berdyansk to Libya.

Unfortunately, many enterprises are unwilling to load containers at their warehouses. Port workers have to do this themselves or ship general cargo by conventional means. The foreign trade associations of the USSR Ministry of Foreign Trade must help (not just us) solve the problem of containerization of export cargo.

Not everything is working properly with import either. About one-third of the containers carrying import cargo have to be emptied in the ports of the basin. The point is that the Minister of Railroads continues to be unwilling to expand the list of railroad stations capable of processing large containers.

We intend to broaden the functions of ro-ro class ships and use them to deliver general cargo, for example in sacks. The first test indicates that there is great potential for reducing the downtime of specialized ships.

All this will make it possible to speed up the delivery and processing of important national economic cargo, and eliminating the obstacles will make it possible to search for new reserves to overfulfill the plan for the year of the 60th anniversary of the formation of the USSR and the five-year plan as a whole.

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NEW VARNA-KIEV SHIPPING ROUTE

Kiev PRAVDA UKRAINY in Russian 23 Sep 82 p 3

[Article by A. Maliyenko, Kiev: "On the Varna-Kiev Line"]

[Text] The Kiev river port now provides the capital of the Ukraine with an outlet to the sea: regular shipping traffic has begun between the ports of Varna and Kiev. The decision to organize trips on this line was made at a recent meeting of experts from the Bulgarian Ministry of Transportation, the Ukrainian Main Administration of the River Fleet, the USSR Ministry of the Maritime Fleet, the USSR Ministry of Foreign Trade, and the Soviet Danube Steamship Company.

Until last year mixed river-seagoing ships could not come up the Dnepr beyond Zaporozh'ye. The second phase of the Zaporozh'ye ship lock opened the way to the Middle Dnepr. The diesel ship Vlas Chubar was the first ship to travel this new route, carrying cargo from Italy to Kiev. Subsequent experimental trips by other ships also proved the possibility and great superiority of direct (without transshipment) communication between the city on the Dnepr and ports on the Black and Mediterranean seas. The number of these trips increased significantly with the opening of a regular line. The principal type of cargo delivered on this route is canned food from Bulgaria.

"Kiev port workers have successfully mastered the processing of mixed river-seagoing ships," says deputy port chief V. Panchuk. "The dock in the cargo area uses the method of the Leningrad transportation workers: all cargo which is continuing on by rail is processed directly from the ship to the railroad car. Port workers have obligated themselves to unload ships carrying canned foods at an accelerated pace. They are keeping their word. The holds of each ship that delivers foodstuff are emptied in port 3-5 days faster than envisioned by the schedule."

11,176
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KARAKUM CANAL NAVIGATION

Moscow MOSCOW NEWS in English No 40, 10-17 Oct 82 pp 8, 9

[Article by Yuri Sapozhkov]

[Text]

The ferry *Soviet Uzbekistan* had crossed the Caspian Sea and was slowly approaching the Krasnovodsk Bay, Soviet Central Asia's sea gate. We could not see it yet because of the mountains. Having passed by the bowing port cranes, the ferry deftly came alongside the platform with its narrow-gauge railway, and a few minutes later whole train rolled out of the lower deck.

THE FLOATING BRIDGE

Unsteady on their feet after twelve hours of slight tossing on the sea, the few passengers headed for shore. They had preferred a trip in a comfortable ferry-boat cabin, feasting their eyes on the exotic night sea, to a fast air flight from Baku (only one hour). But according to Leonid Golovko, chief of the Krasnovodsk port, the number of poetic-minded passengers is getting smaller; those travelling on business choose the plane. To offset this, especially in view of the growing goods traffic, the Caspian Shipping Administration has ordered that part of the upper passenger deck be used for containers.

The floating bridge, linking Central Asia with other Soviet Republics, comprises four ferry-boats similar to the one on which we travelled. They carry cotton, mineral raw materials, and animal husbandry products in one direction, and machines, machine tools, grain, timber and vegetables in the other. Of late the share of sand and cement coming in from across the Caspian has noticeably increased — a sure sign, said Golovko, that the Amudarya water, which Krasnovodsk is awaiting so impatiently, is around the corner.

"Around the corner" means almost 400 kilometres from Kazandzhik to where a thin thread of the Karakum Canal has aready reached.

The next day, in a field crisscrossed with irrigation ditches, we were taken to a narrow trench with an earth dam The bottom of the trench was covered with a layer of muddy water. It was the great Karakum Canal's 1101st kilometre. I jumped down to the edge of the water, and suddenly a whole colony of tiny frogs shot up from under my feet, from the dry cracks of the earth. The place had already signs of life.

It was another five hours by helicopter to the bountiful Amudarya. At first one saw the westernmost end of the canal meandering in the yellow sands like a stray traveller trying to find his way, but gradually its route became straighter and its flow more confident. The narrow strips of land with melons gave way to luxurious green carpets of cotton fields. The Mary Region was beneath us. From here to the mouth of the Amudarya, the Lenin Karakum Canal, under construction for more than a quarter of a century now, is navigable. There was busy traffic on it, like on any large river. Barges loaded with building materials and other goods, launches, and suction dredges moved up and down the canal. This area, right up to the Amudarya, is the canal's main cultivated zone — almost 500,000 hectares.

One of our neighbours in the helicopter was a shepherd. With his face pressed to the porthole, he was peering at the land below, as if trying to see his flock of sheep there.

With the building of the canal, which has brought water to the once sun-scorched pastures, the desert has begun to provide karakul pelts for 50,000 people annually.

WATER MEASURED BY DROPS

I got this information from Klychdurdy Sakhatmuradov, First Vice-Chairman of Turkmenia's State Planning Committee He comes from a large farming family — his father and mother were cattle breeders, like all other people in their aul (desert settlement). His grandfather, Khan-Ali, had been irresistibly drawn to the land. The Murgab River, which flowed in their parts, was fed by the snow-covered mountains and lost much of its water in summertime. Well water was treasured more than anything else, literally it measured off by drops. Incredibly enough, the grandfather managed to have an orchard and a vegetable garden. The camel's thorn plant was to him a symbol of endurance and patience. He seemed to go without water himself, saving it for his plants. To conserve as much moisture as possible, he made deep furrows in the soil, called dzhois. When the crops were killed by heat and the scorched plots of land had to be ploughed up, the old man wept.

"My grandfather prayed for water day and night, but today we even forget sometimes to turn off the faucet properly," Sakhatmuradov said. He took a pencil and spread out the map of the Karakum Canal on his desk. "Look here: when this thin blue thread reaches Krasnovodsk, our irrigated farmland will add up to one million hectares. I can already see boundless white cotton fields. We shall grow fine-fibre varieties here. In the south-western areas of the Republic we shall have subtropics, complete with everything that is supposed to grow in such a zone."

SIBERIAN RIVERS TO HELP OUT

Klychdurdy Sakhatmuradov, a son of the great desert, went on enumerating all the good things that will come with the victory over the desert. But in my mind's eye I saw only the dead expanses of sand enveloped in haze. So I said to Klychdurdy:

To quote a Turkmen saying, "A gazelle would lose its hoofs and a bird would have its wings scorched off if they tried to cross the desert". No living creature could stand up to the 35 million hectares of the Karakum desert. What would an oasis of one million hectares be but a mere captive amid this ocean of sand? And according to expert opinion, soon the Amudarya and the Syrdarya will have nothing more to give to the "black sands". What then?

"The Siberian rivers can help us by sharing part of their water resources with us, enabling us to cultivate another 12 million hectares of desert," he said.

But what about the rest of the desert? It looks as if man will never be able to wrest anything more from the sands, will never turn the whole of the Karakum into an orchard. Do you agree with that?

"Yes, I do," Sakhatmuradov said, rolling up the map of the canal. "But in fact there is no need to turn the whole of the desert into something else. That would be disrespectful of Nature and economically inexpedient. The desert will remain a natural and territorial complex. Yet it will also serve man in a multitude of ways. We shall harvest crops of sunshine here, and we'll keep uncovering its wonderful secrets. Take, for example, the life of plants and of living creatures in this incinerator, life which is full of drama and mysteries of adaptation."

...In the hospitable settlement of Nichka we were invited to join in the canal fishing. Everything was done in full conformity with the fishing regulations, said to be very strict in the Karakum desert. Still, the boys caught a huge sheet-fish weighing as much as 20 kilogrammes. They thought, however, that this was a rather modest catch, and were about to try their luck once more, but just then mosquitos went into an offensive, and we had to beat a hasty retreat.

Later, we heard stories told by Durda Khudaiberdyev, a geodesist, who was the first to lay out the Karakum Canal's route, the only one of its kind in the world. Among other things, he told us about his friend, a truck driver, who lost three brothers in the last war. He named his sons Dunyae, Parakhar and Dursun. There are no such names in the Turkmen language, but he invented them with a good purpose. When put together they form a phrase: "May there always be peace!" Today these three brothers are helping build the head reservoir of the Karakum Canal.

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LABOR PROBLEMS AT TERMEZ PORT

[Editorial Report] Tashkent SOVET OZBEKISTONI in Uzbek 24 July 1982 carries on page 2 an 800-word article by newspaper at-large correspondent R. Abdurahmonov titled "River Transport Workers on the Job." The correspondent recalls that in 1957 the small docking facility [pristan'] at Termez on the Amudarya River was changed into an international port for shipping to Hairatan and Sherkhan ports in Afghanistan. In 1964, freight operations at Termez were switched to the brigade method, and in 1974, at the request of these brigades, automated freight handling machinery was installed. According to Javdat Sultonbekov, chairman of the port trade union committee, equipment breakdowns, absenteeism, and freight damage, have resulted in labor discipline problems. Whereas transport workers handled 630,000 tons freight in the last quarter of 1981, this figure declined in first quarter of 1982. The trade union committee and the port authority have issued regulations covering labor discipline and freight and equipment security, and have hiked pay incentives, which have improved second quarter 1982 results. The correspondent concludes with a list of outstanding brigades and vessels. The latter are the "Oleg Koshevoy," captained by I. A. Simkovskiy, the "Brest," captained by Sh. Bozorov, the "Shaydakov," captained by Kashshof Ismoilov, and the "Ashkhabad," captained by Mamed Rajabov.

CSO: 1836/5

BRIEFS

RIGA DOCK WORKERS—Riga—The dock workers of the Riga seaport have been able to speed up ship processing. They are processing up to 110 railroad cars a shift, which is far above the norm. This success was achieved through close cooperation by all elements of the transportation center: seamen, dock workers, and railroad workers. [Text] [Moscow TRUD in Russian 24 Aug 82 p 1] 11176

CENTRAL ASIAN SHIPPING—The ships and barges of the Central Asian Steamship Company are sailing along the Amudarya day and night. During the weeks of the shock labor watch in honor of the 60th anniversary of the formation of the USSR the water transportation workers have delivered 160,000 tons of various types of cargo beyond the plan to the cotton growers of Turkmenistan and fraternal Uzbekistan, as well as to the Democratic Republic of Afghanistan. During this time labor productivity has risen by five percent compared to the plan and they have received 24,000 rubles of additional profit. The collective of the steamship company is competing with the collective of the Danube Steamship Company. According to the results of the second quarter the Amudarya river workers won the prize. The challenge pennant and first monetary prize of the USSR Council of Ministers and AUCCTU were awarded to the crew of the diesel ship Shadykov (Captain — K. Islamov, and Engineer S. Vasil'yev). The crews of the diesel ship Aktivist and the dredge AD-9 were awarded the challenge pennants and the second and third monetary prizes of the USSR Ministry of the Maritime Fleet and the Central Committee of the sector trade union. The collectives of the port of Termez, the Chardzhou Ship Repair Yard imeni XX-Letiya TSSR, and the basin route administration were commended for good work. The labor enthusiasm is not diminishing. The crew of the diesel ship Khamid Gulyam, whose captain is steamship company veteran N. Nosov, is making express runs along the Karakum river. It consistently delivers essential material for construction of the Zei skoye reservoir. The crew of the diesel ship Sevastopol', directed by young captain V. Kiselev, carries agricultural cargo on the Chardzhou segment of the canal. By the anniversary of the USSR the collective of the steamship company has obligated itself to deliver 290,000 tons of national economic cargo beyond the plan to destination points. During the 11th Five-Year Plan they will ship an additional 500,000 tons. This will be the river workers' contribution to carrying out the USSR Food Program. After all, 80 percent of the cargo is destined for rural workers in the region. [By A. Abramstev] [Text] [Ashkhabad TURKMENSAYA ISKRA in Russian 27 Aug 82 p 1] 11176

NEW CENTRAL ASIAN SHIP—A new diesel ship of the Central Asian Steamship Company has set out on its first voyage. On its side it carries the name Vladimir Mayakovskiy. The ship was built in the Aralsk shipyard. It has the latest navigation instruments and equipment and good working and living conditions for the crew. The Vladimir Mayakovskiy is the second such ship the steamship company has received during this anniversary year. The diesel ship Zelili has already begun its working career. Its crew is now standing labor watch on the Karakum river. It is interesting to noted that many of the diesel ships working on the waters of the Amudarya and the Karakum Canal imeni V. I. Lenin carry the names of famous poets and writers: Makhtumkula, Seida, K. Fedin, N. Tikhonov, B. Kerbabayev, and others. For the most part these ships have been added to the fleet of the steamship company in recent years. [By B. Dzhumayev] [Text] [Ashkhabad TURKMENSKAYA ISKRA in Russian 3 Sep 82 p 3] 11176

CSO: 1829/005 END